

Sentinels Splinter

Summary of Sentinels Issues

- Is the current definition of the Sentinels the right one? Are 4 Inner Heliospheric Sentinels (IHS) plus 1 Far Side Sentinel the right choices?
- Is the L1 Sentinel part of LWS?
- Is the current launch schedule right? Should Sentinels launch earlier?
- Can we overlap with STEREO?
- What are the optimum IHS and FSS orbits?
- What data needs to come down in real time?
- Should we measure >100 MeV particles?
- Should Sentinels monitor the Solar Irradiance?
- How important are Far Side Helioseismology measurements?
- What technologies need to be developed?

Is the current definition of the Sentinels the right one?

Current definition:

- 4 Inner Heliospheric Sentinels covering 0.5-.95 AU in ecliptic (Fields and particles, spinner, inclination < 10 degrees)
- 1 Far Side Sentinel starting at 180 and later drifting to 220 degrees (Fields and particles + helioseismology+ EUV, 3 axis stabilized)

Should we have fewer Sentinels and try to get out of the ecliptic?

- How important is the 3D structure of the heliosphere?
- Should the Solar Polar Imager be launched earlier?
- Should solar sail technology development be accelerated?
- How will ESA's Solar Orbiter fit in with LWS?
- How will Japan's L5 mission fit in with LWS?

Do we need a coronagraph at 90 degrees to replace STEREO?

Is Far Side Sentinel needed for the heliospheric goals ?

Is it a "Solar" mission in disguise?

Need to monitor backside to relate *in situ* observations to solar activity

Unique measurements by FSS:

- Monitor active regions, energetic particle sources on back side approaching the limb (EUV)
- Measure photospheric magnetic fields on backside
 - Follows evolution of flux on backside
 - Creates better boundary conditions for coronal magnetic field models

How important is FSS helioseismology?

Two spacecraft separated >90 degrees needed to see deep into convection zone to see flux rising for even longer forecasting times

These measurements crucial to improve theoretical models of convection zone -- Current models break down; need constraints from observations

Is the current LWS launch schedule right?

LWS Goal: SDO, Sentinels, and Mappers in place for Solar Maximum in 2010

Sentinels prefer rising phase while Mappers prefer declining phase

Sentinels need 1 year to get on station

Launching Sentinels before Mappers lowers cost of Mappers by reducing lifetime requirement.

Sentinel lifetime less of an issue because of design, location

Launching Sentinels before SDO gives good overlap with STEREO

STEREO launches in 2004 and drifts 22 degrees/year

4 years to ~90 degrees

What is the optimum timing with respect to STEREO?

Is the L1 Sentinel part of LWS?

Upstream solar wind monitor is required.

Who is supplying it?

- What is the definition of the L1 Sentinel?

How many spacecraft at L1?

Effect of spatial gradients in solar wind on magnetosphere not understood

One option: 1 L1 spacecraft with magnetic field and solar wind plus several others at L1 with only magnetometers

What are the optimum IHS and FSS orbits?

Many options for orbits of the 4 IHS spacecraft

- Optimize for coverage of Earth-Sun line?

- Optimize for radial alignment?

Many options for Far Side orbit

- Start at 180 and drift?

- Start at 120 and drift backward?

- Use SEP so not limited by drift orbits?

- What is optimum location for helioseismology ?

Sentinels Mission Design Issues

What data needs to come down in real time?

What data needs rapid (minutes) processing?

Commercial vs. custom spacecraft bus?

Need trade studies on orbits, data rates, etc.

Sentinels Science Instrumentation Issues

Should we measure high (>100 MeV) particles?

Relevance to astronauts: Not required for actual monitoring, but are necessary to develop understanding of the acceleration process.

These require larger, heavier instruments than in current Sentinels concept

Should this be done outside of LWS? (STP, Explorer?)

Should we measure solar irradiance from all Sentinels?